0-5minutes: Miscellaneous: class announcements/start of class. Go over class objectives and goals.

5-10 minutes: Objectives and Brainstorming: Go over objectives for the day, ask students to brainstorm a simple ring-toss game and draw it on a sheet of paper. Compare with a friend to see what ideas they had, and come together as a class to create a definition:

Goal: have students define that they need a pole sticking up from a base, onto which a ring can be thrown and land securely around the pole.

10-15 minutes: Level 1 Prototype: Give students 5 minutes to build a level-1 prototype of their ring-toss game (in their teams) with the following materials: paper, popsicle sticks, tape, pipe cleaners.

15-20 minutes: Level 1 Prototype Reflection: ask teams to answer questions about their prototype:

* What size did you make the base compared to the pole? Is this a full-size model or a scaled version? What scale would you use?
* How did you get the pole to stand up straight? What material size and/or attachment method do you think you would use if you were building this out of wood?

20-45 minutes: Safety Overview: Watch all of the videos for each type of material, and ask students if they have any questions after each video. I pass around the saw and file during those videos as students may not have held one before. We will then let them use those tools in their prototype v2.

45-60 minutes: Level 2 Prototype: ask students to make a prototype v2 out of wood only. They can use any of the hand-tools provided in the space. Each team is given 1 sheet of wood, and they should only plan to use ½ of their sheet of wood for this prototype. Teams WILL NOT FINISH! That is okay- the discussion of timing is huge in the reflection. Move on to stay on track with time.

60-65 minutes: Level 2 Prototype reflection- as teams finish, ask students about their prototype process. What difficulties did they encounter? How would they resolve them? What did they learn from this that might apply to their own puzzle manufacturing?

Example: many teams were probably stumped by how to attach the thin wood “rod” strip to the base and keep it upright. We didn’t have wood glue, and we didn’t have screws that would hold the wood together in a T-shape properly. However, ask students to reflect on wall shelves- how is a single shelf usually mounted to a wall? Usually with a triangle support/bracket underneath it. Students can use the material to create a small triangle that will better brace the piece and allow for woodglue rather than the need to use screws.

65-70 minutes: cleanup. Have students cleanup all wood-working supplies, return tools, and use the shopvac to cleanup any sawdust.

70--85 minutes: introduction to laser cutting. Have the team use lab computers to open Adobe Illustrator. They will follow instructions to make a basic shape. The shape will be cut, the text will be etched. Keep the font small and minimal to keep cutting quick!

85-100 minutes: Time to cut! Have at least one individual (I ask for a non-LLC student who has a flash drive as a volunteer) cut their design! A Makerspace staff can help show the transition from “design” to “print” on the connected printer with proper settings and safety.